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Oil company and university team up to push for clean air

By: Hilary Parker , Staff Writer

Two join forces to find solution to the carbon dioxide and climate problem

There's nothing like a little friendly competition and a race against time to inspire scientists to get things done.

About six years ago, British Petroleum arrived on the Princeton University campus with a challenge. The giant oil company had concluded that finding a solution to the carbon dioxide and climate problem was essential to the survival of its business — and the planet — and was seeking help from outside experts, to the tune of a \$15 million grant. Company representatives told Princeton scientists they wanted them to compete with Massachusetts Institute of Technology and Stanford University for the opportunity.

"I had never done anything applied — I'm an ivory-tower scientist," said Steve Pacala, the Petrie Professor of Biology in Princeton University's Department of Ecology and Evolutionary Biology. But after meeting with BP, he set out to learn as much about the technology available as he could. At the same time, he thought about his own children, and his responsibility to society.

At the conclusion of his month-long research frenzy, he realized something. "I wasn't sure that my generation couldn't solve this problem," he said of carbon dioxide emissions and global warming. "I felt a real responsibility to give it a try."

While Dr. Pacala may still think of himself as an ivory-tower scientist, he is now the co-director of the Carbon Mitigation Initiative, a decidedly applied research project. Along with Robert Socolow, the other co-director of the CMI and a professor in Princeton's Mechanical and Aerospace Engineering Department, Princeton's pitch to BP easily won the grant. The 10-year CMI project just passed its halfway mark last month.

"We pitched it as an environmental, not a technological, problem," said Dr. Pacala, noting that Princeton won the grant even without a petroleum engineering department, something both Stanford and MIT have. After winning the BP grant, he wrote a short note to Bill Ford, chairman of the Ford Motor Co., explaining the initiative. Mr. Ford responded promptly with a check for \$5 million.

While there are many scientists who still claim that carbon dioxide's effects on global warming have to be fully understood before any steps can be taken to solve the problem, Dr. Pacala characterized this as a stall tactic. He noted that there is no evidence that carbon dioxide is not responsible for global warming, and the CMI focus is on moving toward the "end game," as he calls it. "We need to be talking about a solution," he said.

Perhaps the most highly visible research to come out of the partnership between BP, Ford and Princeton so far is from an August 2003 paper that Dr. Pacala and Dr. Socolow published in the journal "Science."

The paper introduces the idea of "stabilization wedges" — essentially 15 different strategies that would reduce carbon dioxide emissions by 1 billion tons per year. For instance, one wedge would be to cut the number of miles driven by cars in half, another would be to capture and store the carbon dioxide emitted from 180 power plants. If seven wedges were accomplished between 2005 and 2055, the projected doubling of carbon dioxide in the atmosphere over pre-industrial levels would be halted.

Two of the most significant implications of the stabilization wedges concept are that the technologies already exist, and that there is not just one solution to the problem.

"It is designed to give the ability to envision the solution to the carbon mitigation problem," said Dr. Pacala, but he does not point toward any one wedge as the "magic bullet" solution. "We want to keep the smorgasbord as broad as possible," he said.

Since the concept of stabilization wedges "combines a time scale and an amount," two things on which policy makers are likely to focus, it has been well received by world governments. Dr. Pacala said that Canada and the countries of the European Union regularly refer to the concept, and it's in the U.S. government's vernacular, too. "They use the lingo," he said.

Reflecting back on the first five years of the CMI, Dr. Pacala is pleased with the progress that's been made.

"One of the goals was to move to a point where some technological innovations were being employed at scale," he said, and now "there is commercial deployment."

For instance, BP is investigating a new carbon-free power plant. Gardiner Hill, manager for Group Environmental Technology, explained that, if the project is approved, the carbon dioxide produced by the 350-megawatt power station to be located in Scotland will be captured. It will then be injected into an oil reservoir under the North Sea to enhance oil recovery, and it will remain sequestered there, 2½ miles below the surface.

Mr. Hill said this is one example of BP's making use of the technologies coming out of the CMI, and that in the next five years, the company wants to continue to help Princeton scientists understand the problems facing its industry, but then "to give them free rein." He said that one of the most important aspects of the CMI relationship is that the scientists are allowed to come up with the technologies.

Of course, it is not just big business that can make use of CMI research. There are plenty of things that individuals can do to lessen their own carbon dioxide emissions, like buying compact fluorescent light bulbs and fuel-efficient vehicles, but Dr. Pacala noted that "individual actions aren't going to do it in the end. We're going to have to have a national policy."

He said that governments should want to solve the carbon mitigation problem, because it intersects with other problems. For instance, he noted that oil price shocks have huge economic impacts, and a move away from a reliance on fossil fuels would allow governments to disengage economically from the political instability of the Middle East. In addition, the health-care costs attributed to air pollution are massive. These problems cross party lines, he said, and in the next five years the CMI will continue to address what is

truly a bipartisan, global issue.

"You can come at this problem from the right or the left, and you end up with almost the same answer," said Dr. Pacala.



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